WHAT IS CLAIMED IS:

1. A device for uniformly changing the length of an optic fiber along its longitudinal axis, said device comprising:

a support having a circumference around a single point;

a fiber having its longitudinal axis attached to said support circumference so that the longitudinal axis of said fiber assumes the same geometry as said support circumference; and

a mechanism for changing said support circumference.

2. The device of claim 1 wherein said fiber is not coaxial to the neutral axis of said support.

3. The device of claim 1 further comprising:

a mechanism for unfurling said support; and

a mechanism for at least one of stretching and compressing said support.

4. The device of claim 1 wherein:

said support is composed of a material capable of expanding and contracting when heat is applied and removed respectively; and

said expanding and contracting mechanism is temperature dependant.

5. The device of claim 4 wherein said material possess a greater than average coefficient of thermal expansion.

6. The device of claim 4 wherein said material is Ni-Ti.

7. The device of claim 1 wherein said support circumference does not complete a 360 degree circle, thereby having at least two ends at which force can be applied.

8. The device of claim 1 wherein said mechanism applies selective force to at least one of said ends of said support circumference.

9. The device of claim 8 wherein said force is applied as a torque.

10. The device of claim 7 wherein one of said ends is affixed to a rigid structure and wherein said mechanism applies a force to said other end.

11. The device of claim 7 wherein said circular support has a cross section thicker at its apogee than at its respective ends.

12. The device of claim 11 wherein said mechanism includes applying force to one of said ends while the other of said ends is held rigid.

13. The device of claim 11 wherein said mechanism includes applying force to both of said ends.

14. The device of claim 12 wherein said support structure is within a housing and wherein said force is applied by a screw pressing against at least one of said ends, said screw being supported by said housing.

15. The device of claim 7 wherein said optic fiber is part of a fiber optic transmission cable and wherein said mechanism is remotely activated.

16. The device of claim 15 wherein said remote activation results from performance observations of transmission along said fiber optic cable.

17. The device of claim 1 wherein said circular support has a cross section adapted to produce any desired non-uniform strain along said fiber.

18. The device of claim 1 wherein said fiber is a fiber Bragg grating.

19. A device for changing the longitudinal dimension of an attached fiber Bragg grating, said device comprising:

an expandable circumferential structure around which said fiber can be rigidly attached; and

a mechanism for applying forces to selective portions of said structure so that the radius of said circumferential structure changes in response to applied ones of said forces.

20. The device of claim 19 wherein said structure has a uniform cross section.

21. The device of claim 19 wherein said structure has different cross sections at different locations thereof.

22. The device of claim 19 wherein said mechanism includes:

a screw for applying forces to an end of said structure.

23. The device of claim 19 wherein said device includes a pair of domes adapted to mate together at their respective peripheries and wherein said structure is positioned to provide a flexible mating coupling for said domes.

24. The device of claim 23 wherein said mechanism includes an actuator for applying said force to at least one of said domes to move said domes closer to each other thereby causing said flexible coupling to expand uniformly.

25. The device of claim 24 wherein said actuator is one in the set of actuating devices consisting of ferroelectric actuator, ferromagnetic actuator, motorized actuator, mechanical actuator, and thermal actuator.

26. The device of claim 24 further comprising:

a bar with an appropriate coefficient of thermal expansion inserted between said actuator and said discs, wherein said bar compensates for any thermally induced wavelength shift in the fiber Bragg grating.

27. The device of claim 19 wherein said device includes a pair of discs adapted to mate together at their respective peripheries wherein said structure is position to provide a flexible mating coupling for said discs.

28. The device of claim 27 wherein said mechanism includes an actuator for applying said force to at least one of said discs to move said discs closer to each other thereby causing said flexible coupling to expand uniformly.

29. The device of claim 28 wherein said actuator is one a the set of actuating devices consisting of ferroelectric actuator, ferromagnetic actuator, motorized actuator, mechanical actuator, and thermal actuator.

30. The device of claim 28 further comprising:

a bar with an appropriate coefficient of thermal expansion inserted between said actuator and said discs, wherein said bar compensates for any thermally induced wavelength shift in the fiber Bragg grating.

31. A method for changing the characteristics of a fiber, said method comprising the steps of:

fastening the longitudinal axis of said fiber to at least a portion of one circumference of an expansion device, said circumference having a radius R around a center point; and

applying force to a selective portion of said expansion device to cause said radius R to change.

32. The method of claim 31 wherein said expansion device is not continuous and forms two ends thereof and wherein said force applying step includes the step of:

applying said force to one said end of said expansion device while said other end is held in a relatively fixed position.

33. The method of claim 31 wherein said expansion device includes a flexible connection between two half spheres and wherein said force applying step includes the step of:

applying said force to at least one of said half spheres to cause said flexible connection to change said radius R.

34. The method of claim 31 wherein said fiber is included within a fiber optic cable, and wherein said fastening step includes the step of bonding at least a portion of said cable to said expansion structure containing said fiber.

35. The method of claim 31 wherein said fiber is a fiber Bragg grating.

36. The method of claim 31 wherein said method further comprises the step of:

obtaining transmission characteristics of signals on said fiber optic cable; and

enabling said selective force applying step under control of said obtaining step.

37. A device for changing the applied strain in a fiber Bragg grating, said device comprising:

a circular support having a radius of curvature defined by radius R, said circular support not forming a continuous loop, thereby having ends;

means for attaching a portion of said cable containing said fiber Bragg grating to the periphery of said circular support; and

means for causing said ends to expand with respect to each other thereby changing radius R.

38. The device of claim 37 wherein said attachment is to the outer surface of said support.

39. The device of claim 38 wherein said outer surface has a groove therein for positioning said cable.

40. The device of claim 37 wherein said attachment is to the inner surface of said support.

41. The device of claim 37 wherein said attachment is to a side surface of said support.

42. The device of claim 37 wherein said device is contained within a housing having an input and an output for said cable; and wherein said flex causing means includes means for applying forces to at least one of said ends, said forces applied with respect to said housing.

43. The device of claim 37 wherein said flex causing means is responsive to remotely provided signals.

44. The device of claim 37 wherein said flex causing means is controlled by adjustments applied manually.

45. The device of claim 37 wherein said flex causing means is controlled remotely in response to transmission tuning signals.

46. A method of choosing the strain of a fiber Bragg grating, said method comprising the steps of:

attaching said grating to the circumference of a strain device; and

causing said circumference to controllably change.

47. The method of claim 46 wherein said strain device includes uniform cross section circular beam having first and second ends.

48. The method of claim 46 wherein:

said grating is attached to said strain device at varying angles to said circumference.

49. The method of claim 48 further comprising the steps of:

unfurling said strain device into a linear shape; and

controllably changing the linear strain on said strain device.

50. The method of claim 46 wherein said causing step includes the step of:

fixing a fixed end of said circular beam while moving said second end of said circular beam.

51. The method of claim 47 wherein said strain device includes a semicircular beam having first and second ends.

52. The method of claim 51 wherein said causing step includes the step of squeezing said ends of said semicircular beam.